REMARKS

Original claims 1-19 and new claim 20 appear in this application for the Examiner's review and consideration. The new claim covers a preferred embodiment and is based on the specification (as described below) and the original claims so that there is no issue of new matter. Thus, the new claim should be entered at this time.

Before addressing the current rejections, a brief review of the invention would be helpful. The present invention is directed to the thinning of patterned wafers using implantation in the rear face of the semiconductor material to remove material from the rear face and to have very thin self supported layers, i.e., less than 30 μm (see specification paragraphs [0022] and [0030]) for supporting electronic components or circuits without damaging devices formed on the front face. The final thickness could be about 30 μm (see [0084]) or about 35 μm (see [0081]). This thinning step would necessary be performed after the step of device formation on the wafer (see [0022], [0030] [0043] and [0045]).

Claim 19 was rejected as being anticipated over Matsui et al. US patent 6,191,007 ("Matsui"). Applicants traverse this rejection

Matsui describes a method for transferring extremely thin patterned layers on a support. In all the different options presented in Matsui, the transferred thin layer has always a thickness only about 0.1 to 2 mm (see col. 15, lines 12-13). In most of the embodiments, an implantation is realized on the front face of the substrate that includes the components, and this face is masked to homogenize the thickness of the extremely thin layer that is transferred onto the support.

As noted by the examiner, Matsui does have one embodiment where the wafer has components on its front side and the implantation is conducted through the rear face (see col. 35, lines 1-5) to form a ion implanted layer for detachment. This is done in order to avoid the use of a protection material ("ion implantation regulating material") which is usually included when the implantation occurs on the front face (see col. 34, lines 59-61 to col. 35, line 8). A layer is then transferred onto a supporting substrate by detaching the substrate at the weakened zone.

In Matsui, however, the thin transferred layer from the patterned substrate to the supporting substrate cannot be self-supporting like those of the present invention for at least two reasons :

1) A supporting substrate is mentioned in the text and in the figures of Matsui. It is never suggested that this supporting substrate could be temporary or optional because it is an essential feature in Matsui. Indeed, without this supporting substrate, the detachment of a thin layer having a thickness of about 0.1 to 2 μm at the implantation depth is not possible (see col. 15, line 13). Furthermore, in Matsui, without the supporting substrate, blistering would appear on the uncovered front face of the implanted substrate due to the growth of microcavities produced by the implantation when he substrate is exposed to heat treatments of the temperatures disclosed by Matsui.

2) Moreover, a self supporting layer is defined by its thickness and it does need to be thick enough to not break under its own weight (in the present invention, it is specified that the thickness is on the order of about 30 micrometers or μm (see [0084]). In contrast, in Matsui (col. 35, lines 4-5 and lines 13-15), the implantation is realized in such a way (close to the front surface) that the thin layer is too thin to be considered as a self supporting layer, and it needs a supporting substrate in order to be transferred. In all the different embodiments in Matsui, the transferred layer is at most around 1 μm thick (col. 15, lines 12-13) - a thickness that is not self-supporting.

Accordingly, Matsui is not directed to a transfer of the thin layer by itself, and has no disclosure or teaching to avoid the use of supporting substrate so that this can occur; or to decrease the implantation energy to obtain a thick enough layer to be self supporting to facilitate such a transfer. Thus, the anticipation rejection based on Matsui has been overcome and should be withdrawn.

Claims 1-4, 7-11 and 16-18 were rejected as being unpatentable over the combination of Matsui with Hanson et al. US patent 5,492,0764 ("Hanson") for the reasons set forth on pages 3-6 of the action. Applicants traverse this rejection as well.

Hanson describes a method of reclaiming donor substrates using the well known SMART-CUT® process (see col. 3, lines 55-58). The rejected wafers are submitted to different processing steps for removing unwanted layers and then, are thinned by:

chemical etching (see col. 3, lines 59-61) to remove metals and insulators;

planarization (see col. 4, lines 7-19) to smooth the surface; and

with the steps of the conventional SMART-CUT ® process (implantation, heating and detaching) for removing diffusion and buried oxides (see col. 4, lines 2-37).

Hanson is directed to thin defected or rejected wafers used in the fabrication of devices for reusing the wafers. Even if it is disclosed in Hanson (col. 4, lines 37-41) that the different steps of the SMART-CUT® process can be repeated to remove layers, it is well explained that it is the "conventional SMART-CUT (R) process which is applied. This means that the implantation occurs on the front face of the substrate not on the rear face like in the present invention.

Hanson is directed to remove a front face layer comprising defective devices from a wafer, to form a refresh wafer that can be reused. To do so, it is necessary:

to use the SMART-CUT® technology (implantation, heating, splitting, polishing steps)

to have implantation on the front face because the devices do not need to be protected but to be removed with the layer containing them.

Thus, there is no reason to realize the implantation in the rear face of the substrate, and the person of ordinary skill in the art would not have used Hanson to thin a wafer on its rear face for forming a thin self supporting layer with electronic components or circuits. As Hanson does not remedy the deficiencies of Matsui, this rejection should be withdrawn.

Claims 5, 6, and 12-15 were reejct4ed over the prior combination with the addition of further references, such as Henley et al US patent 6,291,314; Kang et al. US patent 6,287,941; Aspar et al. US patent 6,020,252; and Sayyah US patent application 2002-0055237. None of these references remedy the deficiencies of the combination of Matsui and Hanson as to claim 1.

Henley describes a method for fabricating a film with active devices by transferring the layer from a donor substrate to a target substrate. Implantation of energetic species is realized through the front surface of the donor substrate (see col.2, lines 50 and col. 13, lines 6-13).

Kang describes a method for treating a cleaved surface and or implanted surface with a combination of thermal treatment and chemical reaction.

Aspar disclosed the separation of a thin layer having electronic components from a substrate using implantation, heat treatment and mechanical forces. The implantation occurs on the front face of the substrate (see Fig. 1 and col. 4 lines 19-21) and the thin layer is subsequently separated from the substrate by heating

Sayyah describes the transfer of prefabricated devices and circuits from a original substrate to a new substrate.

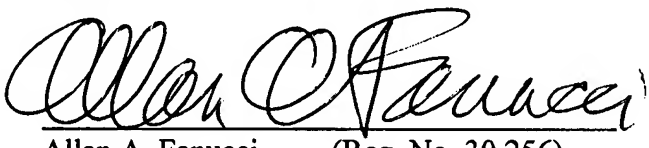
In view of the above, as the combination of references do not result in the presently claimed invention, all these secondary rejections should be withdrawn.

Accordingly, it is believed that the entire application is now in condition for allowance, early notice of which would be appreciated. Should the Examiner disagree, then a personal or telephonic interview is respectfully requested to discuss any remaining issues and expedite the eventual allowance of the application.

Any questions regarding this matter should be directed to the undersigned attorney of record.

Respectfully submitted,

Date: 12/23/05



Allan A. Fanucci (Reg. No. 30,256)

WINSTON & STRAWN LLP
CUSTOMER NO. 28765
(212) 294-3311